Press Release

June 2025

Enhancing Border Security and Efficiency at Ormenio based border through FLEXI-cross Innovation

As part of the EU-funded FLEXI-cross project, a cutting-edge border control pilot was conducted at the Ormenio land border crossing, Greece's northernmost entry point and a vital link between the EU and non-EU territories. Facing increasing cross-border movement of people and goods—especially under heightened geopolitical and migration pressures—border authorities at Ormenio needed a smarter, faster, and more secure way to process travelers and vehicles. The FLEXI-cross solution was deployed to address these challenges through integrated surveillance, AI-powered risk assessment, and mobile identity verification technologies. This comprehensive system not only improves compliance with Schengen regulations but also enhances operational efficiency, traveler experience, and real-time situational awareness at one of Europe's most strategic land border crossings.

Existing Operational Process

Border checks currently follow a structured yet resource-intensive process involving several sequential steps to verify traveler legitimacy and ensure public security. These include:

1. Passport inspection to authenticate identity and nationality.
2. Visa verification where applicable, confirming travel authorization.
3. Entry and exit stamp review to track travel history.
4. Verification of departure and destination to match declared travel purpose.
5. Evaluation of financial means to support the intended stay duration and activities.
6. Means of transport and carried objects inspection, using visual checks and scanning equipment.

While comprehensive, this system relies heavily on human intervention and multiple unintegrated tools, leading to inefficiencies—particularly during high-traffic periods.

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Technology Currently in Use

The technologies currently deployed at the border control premises include:

For Passport & Identity Checks:

- Passport reader
- SIS database (SIS II / SISRecast) for alerts and person/object tracking
- Foster and Freeman device for document validation in suspicious cases

For Visa and Biometric Checks:

- Passport reader
- VIS database for visa authentication
- Two-finger fingerprint scanner (or five-finger if needed)
- Foster and Freeman device (when suspicion arises)

For Departure, Destination & Substantiation Checks:

- Visual/operator-based inspections for steps 3, 4, and 5

For Vehicle and Cargo Checks:

- X-ray systems for object scanning
- Digital tachometers to inspect driving behavior and compliance

These technologies, though individually effective, remain siloed and reactive, with limited real-time intelligence or predictive capability.

Schengen Regulation Compliance

In accordance with the Schengen Borders Code, thorough checks are mandatory for third-country nationals at entry and exit points. Article 6(1) stipulates that border control must include:

- Verification of identity, nationality, and document authenticity.
- Systematic consultation of databases such as:
    - SIS
    - Interpol's SLTD
    - National databases for stolen, lost, or invalidated travel documents

For electronic travel documents, chip data verification is required, depending on certificate availability. In specific situations, border authorities may streamline checks while maintaining compliance through risk-based exceptions.

These regulatory standards form the baseline which FLEXI-cross aims to meet—and exceed—through smart technology.

Operational Gaps Identified

Despite the structured procedures, key operational limitations remain:

1. Lack of a traveler pre-registration app, which would streamline checks.
2. Absence of automatic license plate recognition, limiting vehicle pre-clearance.
3. Need for mobile control devices that integrate document, biometric, and object checks.
4. No UAV/drone-based surveillance to monitor border perimeters.
5. Inability to generate real-time alerts during peak flow surges.
6. Lack of a centralized platform for full situational awareness and asset tracking.

These gaps reduce agility, slow processing, and hinder proactive threat management.

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Technological Re-Design with FLEXI-cross

FLEXI-cross redefines the control flow by introducing a seamless, tech-enabled process:

1. Premises surveillance via fixed and drone cameras
2. License plate recognition cameras for vehicles
3. Contextual risk assessment based on historical and situational data
4. Entity classification (traveler, crew, commercial, etc.)
5. High-traffic alerts to trigger staffing/resource redeployment
6. Pre-registration app for travelers and cargo operators
7. Centralized asset and sensor monitoring
8. Passport verification
9. Visa verification
10. Cross-database referencing for identity/document validity
11. Biometric identity checks
12. Suspicious driving behavior detection
13. Situational awareness dashboard
14. Remote sensing & On-Board Unit (OBU) data ingestion
15. Digital tachometer readings for commercial vehicle compliance

This modular redesign supports scalable deployment at various border types.

Renewed storyline of the Use Case at the Port of Galati

At a modern border control facility, surveillance begins long before the traveler reaches a checkpoint. High-resolution infrastructure and drone-based cameras continuously monitor the premises. As vehicles approach, license plate recognition systems scan and log entries.

A risk assessment system, calibrated by seasonal patterns and incident data, classifies each incoming entity, issuing flow alerts when traffic surges. Pre-registered travelers and drivers, using a dedicated app, have already submitted documentation, enabling faster clearance.

Within the control area, border agents equipped with mobile passport and biometric devices conduct instant ID checks, referencing SIS, VIS, and national databases. If needed, further examination is supported by fingerprint scanners or Foster and Freeman devices.

Advanced algorithms monitor driving behavior, flagging anomalies. Inside cargo zones, digital tachometers and x-ray scanners check commercial vehicles in real time. All this information converges on a situational awareness platform, giving command center operators full visibility across the facility.

This integrated, intelligent workflow minimizes human error, improves response times, and ensures compliance with Schengen protocols—while optimizing throughput and experience for legitimate travelers.

Stakeholder Personas – Pain & Gain

To ensure the FLEXI-cross solution meets the real-world needs of its end users, the project identified and analyzed the roles and challenges of key operational personas at the Ormenio border. These include frontline staff and travelers, as well as supervisory and commercial stakeholders involved in border operations.

The personas involved in this use case include:

1) Border crossing personnel
2) Border security supervisor/command center operator

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3) Traveler
4) Occasional visitor
5) Commercial driver.

PERSONA PHOTO

NAME
Officer Andreas Markou
AGE
35
GENDER
Male
OCCUPATION
Border security officer
JOB Experience
10 years in border security

Primary responsibility

- Conduct passport, visa, and biometric checks
- Verify entry/exit stamps
- Assess travellers' purpose and means of subsistence
- Use databases (SIS, VIS) and scanning tools
- Monitor suspicious behaviour and security threats
- Coordinate with other agencies in case of security alerts

CHALLENGES AND OBSTACLES

- High workload during peak hours
- Manual checks are time-consuming
- Limited real-time information on potential threats
- Lack of automation for low-risk travellers

Motivations

- Ensure border security and compliance with EU regulations
- Facilitate smooth and efficient traveller processing
- Improve technology adoption to reduce workload

Technology used

- Passport readers & biometric scanners
- SIS & VIS databases for identity verification
- Mobile control devices (handheld passport scanners, fingerprint readers)
- Suspicious document detection tools (Foster & Freeman device)

Needs & Opportunities for improvement

- Pre-registration app to fast-track low-risk travellers
- AI-driven risk assessment to prioritize inspections
- Centralized monitoring system for real-time alerts

Figure 1: Border crossing personnel Persona

PERSONA PHOTO

NAME
Inspector Elena Papadopoulos
AGE
42
GENDER
Female
OCCUPATION
Border security supervisor
JOB Experience
15 years in border security and risk assessment

Primary responsibility

- Oversee border crossing operations and personnel
- Monitor real-time security threats via surveillance systems
- Deploy additional resources when needed
- Ensure compliance with Schengen and EU border policies
- Handle emergency situations and escalations

CHALLENGES AND OBSTACLES

- Lack of integration between legacy systems
- Difficulties in real-time coordination of border staff
- Inability to predict peak flow periods effectively

Motivations

- Efficient border security operations
- Technology-driven improvements to reduce manual workload
- Ensure traveller compliance without unnecessary delays

Technology used

- Centralized surveillance platform (fixed and drone cameras)
- License Plate Recognition (LPR) system
- AI-based risk assessment for border traffic
- Mobile monitoring tools for real-time updates

Needs & Opportunities for improvement

- Predictive analytics for managing incoming traveller flow
- Integrated risk assessment system to automate security flags
- AI-powered suspicious behaviour detection

Figure 2: Border security supervisor/command center operator Persona

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PERSONA PHOTO

NAME
Maria Ivanova
AGE
45
GENDER
Female
OCCUPATION
Business consultant
Travel frequency
Crosses the border 4-5 time per week for work

Primary concern

- Fast, efficient border clearance
- Minimizing document checks through pre-registration
- Consistency in security procedures

CHALLENGES AND OBSTACLES

- Long queues at peak hours
- Delays due to manual document verification
- Repetitive questioning despite frequent crossings

Technology preferences

- Pre-registration app for fast-track processing
- Biometric authentication for seamless verification
- Automated risk assessment to reduce manual checks

Figure 3: Taveler Persona

PERSONA PHOTO

NAME
Ahmed Al-Sayed
AGE
30
GENDER
Male
OCCUPATION
Software engineer
Purpose of travel
Visiting family and trourism

Primary concern

- Understanding border requirements
- Avoiding unnecessary delays
- Ensuring safety and smooth entry

CHALLENGES AND OBSTACLES

- Uncertainty about required documents
- Language barriers during border questioning
- Long wait times during peak travel seasons

Technology preferences

- Multilingual pre-registration app
- AI-based document verification for faster processing
- Digital notifications on border wait times

Figure 4: Occasional visitor Persona

PERSONA PHOTO

NAME
Alex Petrov
AGE
50
GENDER
Male
OCCUPATION
Truck driver
Travel frequency
Crosses border 3 times per week for cargo delivery

Primary concern

- Quick clearance at border to avoid delays
- Ensuring cargo security and compliance
- Accurate monitoring of driving hours

CHALLENGES AND OBSTACLES

- Lengthy customs inspections
- Manual processing of vehicle and cargo documents
- Unpredictable wait times at the border

Technology preferences

- License plate recognition for fast-tracking vehicles
- Digital tachometer for automatic logging of driving hours
- Automated cargo scanning using X-ray systems

Figure 5: Commercial driver persona

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The table below outlines the main pain points each persona experiences under current conditions and the corresponding gains introduced by FLEXI-cross technologies and processes.

Role	Pains	Gains
Border Crossing Personnel	• High workload during peak hours • Manual checks are time-consuming • Limited real-time threat information • Lack of automation for low-risk travelers	• Pre-registration app to fast-track low-risk travelers • AI-driven risk assessment to prioritize inspections • Centralized monitoring system for real-time alerts • Enhanced technology adoption to reduce workload
Border Security Supervisor	• Lack of integration between legacy systems • Difficulties in real-time coordination of staff • Inability to predict peak flow periods	• Predictive analytics for managing traveler flow • Integrated risk assessment system for automation • AI-powered suspicious behavior detection
Frequent Traveler	• Long queues at peak hours • Delays due to manual document verification • Repetitive questioning despite frequent crossings	• Pre-registration app for fast-track processing • Biometric authentication for seamless verification • Automated risk assessment to reduce manual checks
Occasional Visitor	• Uncertainty about required documents • Language barriers during questioning • Long wait times during peak travel seasons	• Multilingual pre-registration app • AI-based document verification for faster processing • Digital notifications on border wait times
Commercial Driver	• Lengthy customs inspections • Manual processing of vehicle and cargo documents • Unpredictable wait times at the border	• License plate recognition for fast-tracking vehicles • Automated cargo scanning using X-ray systems • Digital tachometer for automatic logging of driving hours

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Policy Innovation Introduced by FLEXI-cross

The FLEXI-cross solution doesn't only upgrade border technology—it also supports future-proof policy evolution through:

1. Digital Transformation & Smart Processing
    - AI-Powered Pre-Registration & e-Documentation System
    - Multilingual Mobile Border Assistance App
2. Automation and AI-Driven Border Security
    - Automated Biometric Authentication Lanes
    - AI-Based Risk Profiling
    - AI-Powered X-Ray Cargo Scanning
3. Pre-Registration & Smart Screening
    - License Plate Recognition (LPR) for commercial fast lanes
    - Risk-Based Traveler Clearance System
4. Situational Awareness & Surveillance
    - Integrated Real-Time Surveillance Platform
    - Border Traffic Forecasting & Staff Allocation
5. Interoperability & System Integration
    - Centralized Border Security Dashboard
    - AI-Assisted Coordination Platform for multi-agency communication

Conclusion

The FLEXI-cross project demonstrates how an intelligent, modular, and human-centered approach can transform border control from a static checkpoint into a dynamic security and mobility hub. By integrating emerging technologies with policy foresight, FLEXI-cross ensures that EU borders remain secure, efficient, and resilient in the face of evolving global challenges.

More information about the project can be obtained from the project website and social media networks.

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